

low bridging. The country is then flat, or nearly so, to the beginning of the gorge, which is a mile and a quarter from the Rainbow.

It will be necessary to cross the Wairau River twice in the gorge, and once again at the Tarndale Saddle; the first crossing will be near Blacksmith's Creek. There will also be two small bridges over Coldwater and Judge's Creeks, and two tunnels will be required—one near Blacksmith's Gully, 10 chains long, to avoid a rocky point and a slip; the other near Coldwater Creek, 4 chains long. There are also about 12 chains of loose shingle just beyond the last-mentioned creek; but the solid rock crops out in many places, and would lessen the difficulty of retaining it. This plan will necessitate crossing the Wairau River three times in about seven miles, but the bridges would be short (about 14 chains altogether), and good curves would be obtained. The gorge ends at Judge's Creek, and is about two and a half miles long; but the eastern side of the Wairau River still continues steep and high to within about a mile of the Tarndale Saddle, whilst the western side is good terrace-ground, apparently without rock. The grade from the Rainbow to mid-gorge would be about 1 in 74, while the next grade to the Tarndale Saddle would be about 1 in 91, and the next five miles opposite the Tarndale Station would be practically level, excepting a short length of 1 in 71 at the summit. You will observe that the saddle can be crossed in an unusually favourable manner.

For the next thirty miles, to the junction of the Acheron and Clarence, the grades are excellent, and, with the exceptions detailed below, the ground consists of flat terrace-land. Between Tarndale Station and the confluence of the Alma Creek there are three rocky points, but, with these exceptions, it is flat. In rounding the point to the Severn a tunnel, 3 chains long, might be wanted to get a good curve. Between the confluences of the Alma and Saxton there are also three rocky points and a considerable length of sidling. For two miles above the Yarrow confluence there will be some rather heavy cuttings, 20 chains of which will be rocky, but running very straight; or this cutting could be avoided by two bridges over the Acheron of 5 or 6 chains each. A short distance above the Guide confluence there will be one short rocky point to cut through, which is about eight and a half miles above the confluence of the Acheron and Clarence. Here it will be found better to cross again and recross the river one and a half miles lower down to avoid some steep rocky ground. The ground is now favourable as far as the Clarence, where a bridge, about 7 chains long, will be necessary.

I should have mentioned, while describing the line down the Alma from Tarndale, that an alternative line, which may be adopted on survey, can be taken down Traveller's Valley from Tarndale Saddle, with an excellent grade. The ground is not so favourable for the formation, but, being five miles shorter, may have the preference.

From the confluence of the Acheron and Clarence towards the Hossack Saddle the line would keep the terraces of the Clarence about two miles, and then grade away up to the saddle, passing high up over the rocky bluffs which abut on the Clarence some two miles above the Hossack confluence, but it would in its course pass over three gullies. The saddle is attained by a very easy grade of 1 in 136, but the country, especially near the saddle, is rough, and will require great care and skill in laying out to best advantage to save cutting, which will be heavy in places. A cutting at the saddle, of some 75 feet deep and 2 chains long, will be preferable to a tunnel, on account of the narrowness of the top. Going down the Hanmer from the Hossack Saddle is also heavy cutting, and there are several small valleys entering which will improve the grade (which on the section shows as 1 in 48·6).

About the Lottery Saddle the country is flatter, and the hills down the Lottery are rounder, and will work into curves with lighter work than in the Hanmer. The high terrace opposite McDonnell's can be reached by a grade of 1 in 50, and then the terraces that stretch to the Waiau will most probably be found available for the railway to within a mile and a half of Waiau, where it will be necessary to grade down the terrace and bridge the Mason. The alternative inland line from the Lottery Saddle to the Waiau Gorge will make very little difference in distance, but would give a better grade. It would necessitate another railway bridge at the Waiau Gorge, but this is a mere matter of detail survey.

The climate at the Tophouse is mild; the land on and at the foot of the hills is good, but the flats are very poor. Higher up the Wairau River some of the flats improve, and are well grassed. There is a large flat up the Rainbow, and another at Coldwater Creek, which is a narrow mountain stream at its confluence with the gorge, but opens out higher up to a flat some five miles long by a mile wide: this is said to be the coldest part of the gorge. To instance the rarity of high floods in the gorge, Mr. Brough, the Gorge Road contractor, showed me a plank lying across this creek, which he had put there without any fastening twelve months ago; it was two feet above the creek level, and from memory I should say about eight feet above the Wairau River bed. Mr. Brough lived at this spot, in a tent, all the winter of 1881 and part of this year, and the following is his diary, which I copy to give an idea of the climate: "1881—April 17: Arrived in Wairau Gorge and camped; fine weather up to June 14; gale from S.E., with sleet and hail. June 15 to 25: Fine weather. June 26: Snow S.E.; frost and snow 6 inches deep to 29th. June 29: Strong S.E. winds, cold and frosty; Blacksmith's Creek frozen. July 9 to 12: Snowing, then fine weather with S.E. winds up to July 17, with snow on the flats 6 inches deep. July 17 to 25: Cold S.E. winds, with hard frost. July 25: Rain and sleet from N.E., fresh in river; after there was fine weather to August 4. August 4 to 8: Snowing and blowing; snow lay on the flats 2 feet deep up to August 20. August 20 to 22: Heavy rain from N.E.; flood in river, ice disappearing. August 22 to September 9: Fine weather, with cold S.E. winds. September 9 to 11: Sleet and rain; flood in river. September 11 to 28: Beautiful weather, with S.W. winds. September 28: Rain and flood. September 29 to November 1: Beautiful weather; left Gorge for Nelson. 1882—April 19: Arrived in Gorge, fine warm day. April 20 to 23: Fine weather, light S.W. winds. April 24 to 25, fine weather, strong S.W. winds. April 26: Squally, with storms from W. April 27: Much rain, wind N.W. April 28: Fine day, wind N.W. April 29: Fine day, wind S.W. April 30: Slight showers, wind N.W. May 1: Slight snow and sleet, wind S.W. May 2: Slight showers, wind S.W. May 3: Fine, wind S.W. May 4 to 6: Showers of rain, wind S.W. May 7: Showers of sleet, wind S.W. May 8: Heavy rain, strong wind S.W. May 9: Raining, wind N.W. May 10: Snow, wind S.W. May 11: Fine and warm, wind S.E. May 12: Cold sleet, wind S.E. May 13: Fine and frosty, wind S.W. May 14: Slight snow showers, wind S.W. May 15: Cold, with snow; wind S.W.